

3 Market Analysis

This section identifies and quantifies the potential markets for a downtown circulator. It also summarizes information gathered from operators of downtown circulators in other cities and presents circulator service design strategies based on those findings. This analysis of potential markets assumes that a circulator would consist of the DBID proposal, that is a North-South route on or near 7th Street from Mt. Vernon Square to south of the Mall, a two-way loop including F Street and the Mall that would serve the White House and the Capitol, and a loop serving the monuments. It also assumes that the circulator would include a fourth route from Union Station to Georgetown along K Street, as proposed by DDOT. The area examined for potential markets extends to Georgetown and Dupont Circle to the northwest, Massachusetts Avenue to the north, 4th Street NE/SE to the east, and the waterfront to the southwest.

3.1 *Potential Markets for the Circulator*

A downtown circulator in Washington would serve existing travel markets, accommodate new demand to new downtown developments, and may also induce new travel by providing convenient transit connections that did not exist before. This subsection on potential markets focuses on quantifying the existing travel markets. The development of the framework for analyzing the markets is discussed first. The framework had to be developed in a way that accommodated the data that was available, which included visitor counts and several surveys, but included little information on actual travel patterns. The estimate of the size of each market follows, including a discussion of the methodology and the many assumptions and estimates that became necessary given the availability of data. The market estimates included in this subsection can be considered as a conservative base case estimate. New developments and redevelopment in the downtown area could bring about increased use of the circulator, and the presence of circulator service could induce new travel. These potential increases are not addressed here.

3.1.1 Defining the Potential Markets for Analysis

A circulator service in the core of Washington would be able to serve a number of different markets. The travel markets can be defined across a number of dimensions. These include trip purpose, access mode to downtown, origin/destination locations, frequency of travel, group size, and the socio-demographic and psychographic characteristics of the individuals.

The initial framework proposed for assessing the existing markets for the circulator consisted of dividing the market into visitors to the Washington metropolitan area and residents of the metro area. Visitors would be divided into tourists and business/convention travelers. This is consistent with the categories used in many travel industry surveys and reports. The data needed would consist of survey data of visitors' travel patterns, where they are staying, the attractions they visit, and the other activities that they undertake. Residents would be divided into those whose main purpose in traveling downtown is for work and those whose trip is for other purposes. The data needed would be basic travel flows into and within downtown and also some information on specific attractions visited and activities undertaken.

This market analysis needed to be based on existing data regarding travel by the various market groups. Detailed data on travel within the study area and on travel by visitors was sought from DCPG members and from the National Park service. The data obtained included the following:

- **Summary of Smithsonian Institution visitor surveys⁹:** This report describes a profile of Smithsonian Institution visitors based on surveys conducted at major Smithsonian museums in 1994 through 1996.
- **Smithsonian visitor counts¹⁰:** This report provides 1989-1999 monthly visitor counts for each Smithsonian museum.
- **National Park Service monthly visitor counts:** Monthly visitor counts for each NPS facility in the National Capitol Region were obtained from the National Park Service web site¹¹.
- **Visitor counts at other attractions:** When newer updated data was not available, counts from the DBID 1999 study were used.
- **Size and location of Washington DC hotels:** The locations of Washington DC hotels were obtained from a map produced by the Washington Convention and Tourism Corporation. The number of rooms in each hotel was obtained from the Hotel Association of Washington DC.
- **2000 Travel Trends Survey Report¹²:** This report provides information on domestic and international travelers to the greater Washington/Baltimore region. It is developed from a nationwide survey of travel behavior. It includes information on total visitor volumes; trip purpose and mode; trip duration, lodging type, and major activities; and traveler demographics.
- **Downtown BID survey reports^{13,14}:** These reports are based on street intercept surveys of tourists and metro area residents in the downtown and a telephone survey of area residents. The tourist report includes information on tourists in the downtown such as lodging, purpose, frequency of visits, demographics and spending habits. The residents report includes information such as residence location, trip characteristics, demographics, and opinions concerning the downtown.
- **Metrorail origin/destination data:** A station-by-station table of Metrorail origins and destinations for one week in April 2001 was used to identify the areas of origin for trips to the Mall.

⁹ *Visitors to the Smithsonian Institution: A Summary of Studies*, Institutional Studies Office, Smithsonian Institution, April 1997

¹⁰ *1999 Visits to Smithsonian Museums*, Institutional Studies Office, Smithsonian Institution, March 2000

¹¹ www.nature.nps.gov/stats

¹² *2000 Travel Trends Survey Report*, Washington Convention and Tourism Corporation

¹³ *A Tourist Study Conducted for Downtown DC*, Gentlemen Associates, August, 2001

¹⁴ *A Pedestrian and Telephone Research Study Conducted for Downtown DC*, Gentlemen Associates, June, 2001

- **Estimated travel patterns into and within the downtown:** Estimates of travel both into and within the core area for 2000 were obtained from the regional travel forecasting model maintained by the Metropolitan Washington Council of Governments.
- **Downtown employment levels:** Estimates of downtown employment by traffic analysis zone for year 2000 were also obtained from the Metropolitan Washington Council of Governments.
- **Downtown federal employment levels:** The number of federal employees at each federal facility in the downtown was obtained for the year 1999 from NCPC.

The study team was not able to obtain survey data from the National Park Service as their ongoing study of visitor transportation has not yet been completed. The Park Service did provide a preliminary report which included useful information on seasonal variation, day of week variation, and time of day distribution of visitors to the monuments and to the Smithsonian.

The study team found that basic information such as monthly, or at least annual, visitor counts at attractions was widely available, however, more detailed information on travel patterns for visitors was not. With the exception of the Smithsonian Institution survey data, there was no information found on how visitors combine visits to multiple attractions together into one day of sightseeing. (The Smithsonian data did determine the number of Smithsonian museums attended in a single visit, which could last multiple days.) Thus, it became difficult to determine the extent of visitor travel between attractions. Also with the exception of the Smithsonian, there was no breakdown of visitors available between metro area residents, and true “visitors” to the region.

Data was also not found on the hotels used or local addresses of visitors to the region, so that the extent of travel between downtown hotels and attractions could not be directly determined. Only a regional split between hotels and private residences was available from the *2000 Travel Trends Survey Report*, and the location and number of rooms for District hotels had to be used to approximate the origins of hotel-based trips. Metrorail origin-destination data for mid-day trips to/from Smithsonian Station were used to estimate origins of non-hotel based visitor trips.

Only a regional split between pleasure and business/convention travelers was available from the *2000 Travel Trends Survey Report*. This split was not available for any of the attractions.

For metro area residents, no directly observed data on travel patterns within the core area were identified. However, estimates from the regional travel forecasting model can be used to examine travel within the downtown area. Such regional model estimates are derived from observed behavior and other estimates, and tend to be more useful at a more regional level, but in the absence of directly observed data, they can approximate actual travel. They tend to be less accurate where there are a few large specialized travel generators, such as the museums on the Mall, but better at estimating travel among a large number of employment sites and commercial attractions.

Overall, the greatest gap in the data available appears to be the lack of information on travel patterns of visitors to the attractions. A beneficial data collection effort would be a survey of visitors at a variety of the monuments, museums, and other attractions that included questions on where they live or are staying locally (which hotel or community), which other attractions they visit that day, and what other activities (shopping, dining, etc.) they would engage in. The

National Park Service recently undertook such a survey, but the results were not available in time to aid this study.

Given the data found for this analysis, the initial framework for assessing the existing markets was modified. Instead of focusing on a visitor/resident split of travel, and a subdivision of travel within those groups, the analysis focused first on trips to and among the core area attractions, and then on trips to and within the core area made mostly by area residents. Without data on existing travel between attractions and downtown businesses, and with the substantial improvements anticipated in the downtown area, this analysis of existing markets does not attempt to quantify the market for travel between the attractions and the downtown area.

In the following subsections, both the trips to area attractions and to the core in general are discussed in terms of the initial “access” trip, that is the trip from a hotel or local address to the core area, and subsequent “circulation” trips between attractions or between points in the core area. These are preceded by a discussion of visitor counts at core area attractions.

3.1.2 Visitors to Area Attractions

As noted above, available counts and surveys at core area attractions generally did not distinguish visitors from area residents. They also did not distinguish visitors by the purpose of their visit to the Washington area. As a result, all visitors to area attractions were initially treated as a single group. (An estimate was later used to split attraction visitors between visitors to the region and metro area residents.) Data was assembled from 38 attractions in the core area, shown in Table 3-1 and in Figure 3-1¹⁵. The list of attractions was developed in consultation with the DCPG, who reviewed those included and assisted in providing information on additional attractions. The attractions were grouped into six geographic areas: 1) the Mall from the Washington Monument to the Botanical Gardens, 2) Georgetown, 3) the area around the Capitol, including the Union Station area, 4) the monuments along the Potomac, 5) the traditional downtown, and 6) the area around the White House.

For each attraction, the table and figure show the number of annual visits. In most cases, the figure is for the year 1999, since data for more recent years is lacking in many cases, and the year 2001 is considered atypical. In a few cases, 1997 data was used.

In each of the areas, the attractions are grouped closely together and visitors often visit multiple attractions on a single trip. It is therefore not appropriate to simply add the visitor counts from multiple attractions to determine the number of visitors present in an area on any given day. The table shows how an adjustment factor was used to convert the number of visits to each individual attraction to a number of visits to the area. The only observed data found that could determine this adjustment factor came from the Smithsonian survey data. Their survey indicated that Smithsonian visitors go to 1.68 Smithsonian museums per visit, although one visit can last many days¹⁶. Among visitors making one-day visits, however, the average is 1.41 museums¹⁷. If this figure is adopted as the number of museums visited per day by all visitors, then the number of daily visits to the Smithsonian as a whole is the number of individual museum visits divided by

¹⁵ A single estimate of visitors to Georgetown was used since this figure was available from the Georgetown Business Partnership and Georgetown visitors tend to be less oriented to a few large attractions.

¹⁶ *Visitors to the Smithsonian Institution, A Summary of Studies*, p. 67

¹⁷ *Ibid*

Table 3-1: Visitor Volumes for Major Attractions

Attraction	Annual Visitors	Adjustment	Adjusted Visitors
Mall			
Arthur M. Sackler Gallery	241,000	0.70	168,531
Arts and Industries Building	708,000	0.70	495,105
Freer Gallery of Art	359,000	0.70	251,049
Hirshhorn Mus. & Sculpture Garden	784,000	0.70	548,252
National Air and Space Museum	9,131,000	0.70	6,385,315
National Museum of African Art	257,000	0.70	179,720
National Museum of American History	5,518,000	0.70	3,858,741
National Museum of Natural History	7,469,000	0.70	5,223,077
S. Dillion Ripley Center	353,000	0.70	246,853
Smithsonian Institution Building	1,841,000	0.70	1,287,413
National Gallery of Art	6,200,000	0.70	4,335,664
US Holocaust Memorial Museum	1,700,000	0.70	1,188,811
Botanical Gardens	750,000	0.70	524,476
National Archives	1,000,000	0.70	700,000
Washington Monument	553,420	0.20	110,684
World War II Memorial	4,000,000	0.30	1,200,000
TOTAL MALL	40,864,420		26,703,691
Georgetown			
TOTAL GEORGETOWN	12,750,000		10,200,000
Capitol/Union Station			
Union Station	7,000,000	0.70	4,900,000
Capitol Visitor's Center	3,000,000	1.00	3,000,000
U.S. Supreme Court	600,000	0.30	180,000
National Postal Museum	463,000	0.70	324,100
TOTAL CAPITOL/UNION STATION	11,063,000		8,404,100
Monument Area			
Vietnam Veterans' Memorial	4,442,238	1.00	4,442,238
Lincoln Memorial	4,099,480	0.10	409,948
Franklin Delano Roosevelt Memorial	3,453,171	0.10	345,317
Korean War Memorial	3,249,688	0.10	324,969
Jefferson Memorial	2,218,837	0.10	221,884
TOTAL MONUMENT AREA	17,463,414		5,744,356
Downtown Area			
Fords Theatre	1,159,435	1.00	1,159,435
National Museum of American Art, National Portrait	432,000	0.70	302,400
Newseum	660,000	0.70	462,000
Spy Museum	500,000	0.70	350,000
National Building Museum	422,300	0.70	295,610
National Aquarium	320,000	0.70	224,000
National Museum of Women in the Arts	100,000	0.70	70,000
National Law Enforcement Officers Memorial	200,000	0.30	60,000
U.S. Navy Memorial	200,000	0.30	60,000
TOTAL DOWNTOWN AREA	3,993,735		2,983,445
White House Area			
White House	1,363,332	1.00	1,363,332
Corcoran Gallery of Art	310,000	0.70	216,783
Renwick Gallery	136,000	0.70	95,105
Octagon Museum	50,000	0.70	35,000
TOTAL WHITE HOUSE AREA	1,859,332		1,710,220

1.41. Since the average visitor may experience the Smithsonian at a more leisurely pace than the one-day visitor, this may tend to slightly underestimate the number of people visiting the area.

The table shows the adjustment factor applied for each attraction. The method of estimating the adjustment varied somewhat by attraction area. For Mall attractions, the Smithsonian figure ($1/1.41 = 0.70$) was used for all museums, even those not part of the Smithsonian. For the other Mall attractions, such as the Washington Monument, a lower factor was used. The factor of 0.20 for the Washington Monument reflects an assumption that 20% of Washington Monument visitors would not visit a Mall museum on the same day.

In other areas, no data was found on which to estimate an adjustment factor, so judgment was used. In each area, a factor of 1.00 was used for the attraction with the highest visitor count. Then, for the other attractions, a factor was selected to reflect the assumed percentage of visitors to that attraction that would not visit the highest volume attraction in that area on the same day. For the monuments area, for example, the Vietnam Veterans Memorial attracts the most visitors. Since visitors tend to make short visits to each memorial and visit multiple memorials, a factor of 0.10 was used for the other memorials reflecting an estimate that only 10% of visitors to those memorials would not visit the Vietnam Veterans Memorial.

The table shows the application of the adjustment factor to convert total annual visits to each *individual attraction* into visits to *each area*. The figures represent visitor-days. The number of individuals would be even less, as an individual may visit an area multiple times on a multi-day visit to the city. This estimate of visitor-days by attraction area forms the basis for the estimate of circulation trips between attraction areas and access trips to and from attraction areas in the next two subsections.

3.1.3 Circulation Trips Between Attraction Areas

An important use of the circulator will be to travel among the six attraction areas. While within each attraction area many visitors will likely walk between attractions, the distances between the attraction areas are further than most would be willing to walk. Furthermore, many of the trips between attraction areas are inconvenient by Metrorail, or would involve more walking than the circulator is likely to require.

Unfortunately, no data was found that would identify the rate at which visitors travel between attractions. Therefore, professional judgment had to be used. Table 3-2 shows the assumptions made regarding visitors traveling between two areas on a given day. For each combination of areas it was assumed that the same number of people would travel in each direction. That number was estimated for each combination and the share of total visitors in each area that that represents is shown in the table.

The number of trips within each attraction area can be estimated by subtracting the adjusted visitors from the total visitors in Table 3-1. In some areas, such as the mall and downtown, most of these trips would be too short for the circulator to be a reasonable option, while in other areas, such as the Capitol/Union Station area, attractions are spread out enough so that visitors might use the circulator. In each area, an estimate was made of the percentage of trips within the area that would be long enough so that the circulator would be a reasonable option. These estimates are shown in the last column of Table 3-2.

Table 3-3 shows the resulting annual volumes of travel among the six attraction areas. Volumes were assumed to be equal in each direction. (No visitors were assumed to visit three areas in one

Table 3-2: Estimated Percentage of Visitors Visiting Two Areas

Area	Estimated Percentage of Area Visitors who would also visit...						Est. % long walk trips <i>within</i> area
	Mall	Georgetown	Capitol Area	Monuments	Downtown	White House	
Mall		3.1%	4.7%	4.3%	2.2%	1.9%	10.0%
Georgetown	8.0%		4.1%	2.8%	1.5%	0.8%	50.0%
Capitol Area	15.0%	5.0%		6.8%	5.3%	1.0%	75.0%
Monuments	20.0%	5.0%	10.0%		5.2%	3.0%	40.0%
Downtown	20.0%	5.0%	15.0%	10.0%		5.7%	20.0%
White House	30.0%	5.0%	5.0%	10.0%	10.0%		40.0%

Table 3-3: Estimated Annual Trips Within and Between Attraction Areas

Origin	Destination						TOTAL
	Mall	Georgetown	Capitol Area	Monuments	Downtown	White House	
Mall	1,416,073	408,000	630,308	574,436	298,345	256,533	3,583,693
Georgetown	408,000	1,275,000	210,103	143,609	74,586	42,756	2,154,053
Capitol Area	630,308	210,103	1,994,175	287,218	223,758	42,756	3,388,317
Monuments	574,436	143,609	287,218	4,687,623	149,172	85,511	5,927,569
Downtown	298,345	74,586	223,758	149,172	202,058	85,511	1,033,430
White House	256,533	42,756	42,756	85,511	85,511	59,645	572,711
TOTAL	3,583,693	2,154,053	3,388,317	5,927,569	1,033,430	572,711	16,659,773

Table 3-4: Estimated Average Daily Trips Within and Between Attraction Areas

Origin	Destination						TOTAL
	Mall	Georgetown	Capitol Area	Monuments	Downtown	White House	
Mall	3,854	1,110	1,715	1,563	812	698	9,752
Georgetown	1,110	3,470	572	391	203	116	5,862
Capitol Area	1,715	572	5,427	782	609	116	9,221
Monuments	1,563	391	782	12,756	406	233	16,131
Downtown	812	203	609	406	550	233	2,812
White House	698	116	116	233	233	162	1,559
TOTAL	9,752	5,862	9,221	16,131	2,812	1,559	45,336

day.) The table shows 16.7 million annual trips, of which 7.1 are estimated between two areas and 9.6 million are estimated within a single area. (Note that the majority of within-area trips are trips among the monuments.) Table 3-4 shows these figures converted to an average day, for an estimated 45,000 daily trips. These estimates represent the total market for trips between attraction areas that could be served by the circulator, not the projected share that the circulator might attract.

3.1.4 Access Trips to Attractions Areas

The circulator can also play a role in bringing visitors to an attraction area from a Metrorail station, the convention center, or a downtown hotel. The Metrorail system does an excellent job providing access from the region to the downtown employment centers. However, with the exception of the downtown area, the other attraction areas are less directly served by Metrorail. The circulator could bring people closer to their destination from a convenient Metrorail transfer point.

The circulator could also play a significant role in bringing visitors to attractions from the new convention center at Mt. Vernon Square, and from nearby hotels. Nearly 60% of District of Columbia hotel rooms are in the circulator study area. These were grouped by the sub-areas and the total number of rooms in each area is listed in Table 3-5.

The number of visitors traveling to and from each attraction area each day was calculated in Table 3-1. However, as discussed in the previous section, some of these people would be traveling to one of the other areas, not to or from Metrorail or a hotel. These visitors need to be deducted from the Table 3-1 results before estimating the number of access trips to each area. Table 3-6 repeats the total from Table 3-3 and further calculates the percentage of visitors visiting an area who would travel *to* another area that day. (The figure is $\frac{1}{2}$ the sum of the percentages for the corresponding row in Table 3-2 since an equal share would also be arriving *from* another area that day.

The percentage calculated in the last column of Table 3-6 was used to reduce the number of access trips to or from each attraction area. This and the remaining calculations for each area are shown in Appendix A. After eliminating circulation trips, the figures were further adjusted to eliminate access trips made by people in organized tour groups. The *2000 Travel Trends Survey Report* indicated that 5% of visitors to the region are part of organized tour groups. This figure was doubled since it was assumed that tour groups are more likely to be destined for the monumental core than are visitors in general. The resulting estimate of access round trips for each area is shown in the appendix.

The number of access round trips for each area was then divided between the various Metrorail corridors, the convention center, and the downtown hotels. To estimate the number from downtown hotels, the share of attraction area visitors who are metro area residents was first removed from the total¹⁸. The results were then multiplied by the share of visitors staying in hotels¹⁹. Because no data was found indicating the specific hotels used by visitors to the

¹⁸ Smithsonian surveys indicated that 21% of visitors are from the metro area. This figure was used for the Mall, downtown, and White House areas. Half of that percentage was used for the Monument and Capitol areas.

¹⁹ 40% for the region, from the *2000 Travel Trends Survey Report*

Table 3-5: Total Hotel Rooms by Area

Hotel	Number of Rooms
Downtown	3,832
Union Station	1,730
Capitol Area	152
Mt. Vernon Square	1,093
L'Enfant	901
Pennsylvania Avenue	1,055
K Street	2,118
Massachusetts Avenue	3,425
West End	3,158
Georgetown	649
Other District of Columbia	6,811

Table 3-6: Estimated Annual Volumes of Visitors Visiting Two Areas

Area Visited	Visitors Traveling to Another Area	Total Visitors to Area	% Of All Area Visitors
Mall	2,167,621	26,703,691	8.1%
Georgetown	879,053	10,200,000	8.6%
Capitol Area	1,394,142	8,404,100	16.6%
Monuments	1,239,945	5,744,356	21.6%
Downtown	831,372	2,983,445	27.9%
White House Area	513,066	1,710,220	30.0%
TOTAL	7,025,199		

attractions, hotel users were allocated among *all* District hotels in proportion to the number of rooms²⁰. The number in hotels in the circulator study area was then reduced by an estimated number of trips that might originate at the convention center rather than at a hotel²¹. Finally, those staying in hotel areas where the circulator could be used to access a particular attraction area were identified, as were those within walking distance to a particular attraction.

²⁰ This may underestimate the number staying near downtown since visitors to the attractions may be more likely to stay downtown. However, it may also overestimate since only District, and no suburban or Arlington hotels, were considered.

²¹ According to the *2000 Travel Trends Survey Report*, 7.4% of visitors are attending conventions. Therefore 7.4% of *all* visitors were assumed to be conventioners and one half of the trips to attractions made by these visitors were assumed to originate at the convention center.

The numbers of visitors in hotels served by the circulator, or within walking distance, were subtracted from the number of access round trips for each area. The remaining access trips were allocated to the various Metrorail corridors using Metrorail fare gate data showing the origin or destination of all mid-day trips to or from Smithsonian Metrorail Station during a representative week. The result is the estimated breakdown of the market for access round trips by Metrorail corridor, circulator hotel, convention center, and walking for each of the six attraction areas shown in the appendix. This is summarized in Table 3-7 showing annual and average daily access round trips. (Note that while these trips are categorized by Metrorail corridor, they are not necessarily made by public transit. The Metrorail corridor categorization reflects where they would be coming from *if* they used public transit.)

The circulator could play a significant role in serving many of these trips since it would generally provide a closer connection to many of the attractions than would Metrorail, and could replace a transfer between Metrorail lines. When faced with a Metrorail transfer and a longer walk, users may choose to transfer to the circulator instead, and have a shorter walk. Trips to some attractions from some lines, however, can be eliminated from consideration since Metrorail access is good. For example, visitors to the downtown attractions are unlikely to benefit from the circulator no matter which Metrorail line they use since downtown is well-served by all Metrorail lines. Similarly, visitors to the Capitol area and the Mall from the Blue/Orange Line would have little need for the circulator. If these trips are eliminated from consideration, Table 3-8 shows the estimated average daily access round trips that could be served by the circulator. The table shows 74,000 daily access round trips (148,000 one-way trips) that could possibly use the circulator. The largest group would be Red Line users. Area hotel users represent a possible market of about 4,000 round trips²². People attending conventions represent a market of about 3,900 round trips. (The potential market share that could be obtained from these groups is probably much higher than for other users.)

This average day calculation is sufficient for assessing the various markets for a circulator. However, future planning and design of the circulator will require estimates of seasonal variation. The Smithsonian visitor count data included monthly breakdowns of visitors. This data showed that the peak months are April and July when 13% of annual visitors attend in each month. The lowest month is January with only 3.7% of annual visitors. National Park Service visitor counts also included monthly breakdowns. The NPS data showed that the peak month is May when 14.9% of annual visitors attend, and the lowest month is January with only 3.1% of annual visitors. These counts demonstrate that the markets related to travel to, from, and between attractions can be as much as four or five times larger in the peak month than in the lightest month.

3.1.5 Access Trips by Employees and Shoppers in the Core Area

The circulator could also serve trips that are not related to any of the visitor attractions. Thousands of metro area residents travel to, from, and within the core each day. The large number of people in the core area can be illustrated by examining data on employment in the

²² Note that including Massachusetts Avenue, West End, and Georgetown hotels would increase the estimated market substantially.

Table 3-7: Annual and Average Daily Access Round Trips to Attraction Areas

Annual Trips to Attraction Areas							
Origin	Mall	George-town	Capitol Area	Monument	Downtown	White House Area	TOTAL
Blue/Orange Line	12,564,948	4,670,481	3,425,865	2,299,663	1,057,643	593,470	24,612,070
Yellow/Green Line	2,424,931	921,201	683,948	439,487	212,692	116,804	4,799,063
Red Line East	1,664,612	677,202	469,501	301,689	146,004	80,181	3,339,189
Red Line West	4,218,290	1,551,083	1,130,733	775,726	361,827	197,307	8,234,966
Convention Center	646,728	245,684	208,886	134,224	56,725	35,673	1,327,920
Circulator Area Hotels	497,150	305,196	345,633	103,180	70,425	16,235	1,337,820
TOTAL	22,016,659	8,370,846	6,264,567	4,053,969	1,905,316	1,039,671	43,651,027
Average Daily Trips to Attraction Areas							
Origin	Mall	George-town	Capitol Area	Monument	Downtown	White House Area	TOTAL
Blue/Orange Line	34,509	12,827	13,121	6,316	2,905	1,630	71,308
Yellow/Green Line	6,660	2,530	2,619	1,207	584	321	13,921
Red Line East	4,572	1,860	1,798	829	401	220	9,680
Red Line West	11,585	4,260	4,331	2,130	994	542	23,842
Convention Center	1,776	675	800	369	156	98	3,873
Circulator Area Hotels	1,365	838	1,324	283	193	45	4,049
TOTAL	60,468	22,990	23,993	11,134	5,233	2,855	126,673

Table 3-8: Estimated Average Daily Circulator Market for Access Trips

	Mall	George-town	Capitol Area	Monument	Downtown	White House Area	TOTAL
Blue/Orange Line	-	12,827	-	6,316	-	1,630	20,773
Yellow/Green Line	6,660	2,530	2,619	1,207	-	321	13,337
Red Line East	4,572	1,860	1,798	829	-	220	9,279
Red Line West	11,585	4,260	4,331	2,130	-	542	22,848
Convention Center	1,776	675	800	369	156	98	3,873
Circulator Area Hotels	1,365	838	1,324	283	193	45	4,049
TOTAL	25,959	22,990	10,872	11,134	349	2,855	74,159

core. The Metropolitan Washington Council of Governments maintains estimates of employment in the region using a system of traffic analysis zones (TAZ's). Figure 3-2 shows the distribution of employment in the core area by zone. Each dot represents 50 employees. Note that the dots do not represent actual addresses of employment. Rather, employment in each zone is distributed evenly across the zone.

Trips to access employment in the core area are generally now made either by auto or by public transit (Metrorail and Metrobus). Typically, locations are considered accessible by public transit if they are within $\frac{1}{4}$ mile of a transit station or stop. Figure 3-2 also shows a shaded area illustrating areas within $\frac{1}{4}$ mile of a station entrance. The figure shows that Metrorail serves the vast majority of jobs in the core. The most significant exception is the area in the West End around the State Department. Although the circulator may be helpful for these employees, it appears unlikely that Metrorail users in general would find a need to use the circulator to access jobs in great numbers. Thus, trips to access core area employment do not appear to constitute a likely potential market for the circulator and are therefore not considered further.

Comparable data on downtown shopping and other destinations were not found. However, given the extensive Metrorail coverage in the area it also appears unlikely that shoppers would find a need to use the circulator to access their destinations from Metrorail.

3.1.6 Circulation Trips by Employees and Shoppers in the Core Area

Once workers and shoppers arrive downtown, they may need to make short trips within the core area. For such short trips, a $\frac{1}{4}$ mile walk to *and* from downtown Metrorail station entrances, plus the time entering and exiting the stations, may be enough to discourage such short trips by Metrorail. Figure 3-3 again shows employment and Metrorail entrances, but with a smaller $\frac{1}{8}$ mile shaded area around station entrances. Higher employment concentrations outside the shaded area could point to a market for downtown circulation trips on the circulator. Such areas include 14th Street and the FBI building downtown, the area northwest of Farragut Square, the area to the north and east of 16th and K Streets, the area west of the White House, and areas south of the Mall. Figure 3-4 shows the same $\frac{1}{8}$ mile shaded area along with the locations of federal employees in the downtown.

Because no directly observed data on travel patterns within the core area were identified, estimates from the regional travel forecasting model were used to examine travel within the downtown area. Such regional model estimates tend to be more useful at a more regional level, but in the absence of directly observed data, they can approximate actual travel. They tend to be less accurate where there are a few large specialized travel generators, such as the museums on the Mall, but better at estimating travel among a large number of smaller employment sites and commercial attractions. A Year 2000 origin-destination trip table was obtained from the Metropolitan Washington Council of Governments and used to examine travel within the core area.

To estimate the current level of travel within the core that could be served by the circulator, traffic analysis zones in the core were grouped into 17 areas shown in Figure 3-5. These areas correspond closely to the hotel areas and to the five attraction areas discussed above. Year 2000 model estimates of daily trips among these areas are shown in Table 3-9.

To determine which of these trips realistically constitute a market for the circulator, two adjustments were made to the estimates in Table 3-9. These adjustments are shown in Appendix B. These adjustments assumed the circulator system proposed in Section 4. The

Table 3-9: Estimated Daily Trips Between Areas from COG Model

		Destination																	
		Downtown	Union Sta.	NoMa	Capitol	Mall	White House	Mt. Vernon	L'Enfant	Waterfront	Southwest	Const. West	GWU	Penn. Ave.	K Street	DuPont Circle	West End	Georgetown	TOTAL
Origin	Downtown	2,781	461	143	811	124	391	130	651	252	226	290	212	342	1,842	321	190	1,017	10,181
	Union Sta.	466	1,011	59	288	37	110	39	212	73	67	82	53	84	555	94	47	266	3,541
	NoMa	141	58	149	83	11	34	12	59	21	17	22	16	28	171	30	18	80	946
	Capitol	806	287	82	2,191	64	193	55	433	147	128	138	94	133	857	136	74	362	6,176
	Mall	124	36	12	67	35	29	6	58	19	18	22	16	25	136	24	13	66	703
	White House	390	106	36	193	29	630	28	161	59	63	97	71	124	609	105	63	336	3,096
	Mt. Vernon	129	40	13	55	11	27	62	52	17	14	22	15	23	158	24	15	71	745
	L'Enfant	664	210	60	434	59	168	52	1,181	143	118	134	88	129	764	126	72	378	4,777
	Waterfront	257	73	20	150	22	62	17	143	676	40	44	30	43	284	48	24	135	2,064
	Southwest	223	67	18	130	17	58	14	116	38	252	46	31	46	261	42	21	119	1,497
	Const. West	290	82	23	138	21	97	20	126	42	46	457	57	85	421	75	48	244	2,268
	GWU	207	53	15	92	15	72	17	84	29	33	58	254	64	314	53	35	182	1,574
	Penn. Ave.	342	85	27	132	22	117	22	123	43	47	88	64	426	582	100	64	328	2,608
	K Street	1,843	570	168	860	139	577	159	724	280	266	430	319	588	6,156	561	329	1,744	15,708
	DuPont Circle	315	89	31	136	24	103	22	120	44	42	72	58	100	549	559	61	307	2,629
	West End	190	48	16	74	16	60	16	70	25	23	49	34	65	332	60	266	201	1,542
	Georgetown	1,024	269	82	358	70	334	70	368	137	118	244	179	328	1,718	313	199	4,879	10,687
TOTAL	1,553	459	231	1,322	91	436	334	536	1,081	149	575	587	1,471	2,992	953	1,536	10,712	70,737	

first adjustment eliminates trips that are too short to use the circulator or are not likely to have a circulator connection. Trips within an area were also eliminated in most cases. Exceptions were made in several areas where the areas are large and circulator service is expected to be extensive. In these cases, only 50% of estimated trips were excluded. For trips between adjacent areas, 15% of estimated trips were excluded to represent trips that may be short enough to walk.

The second adjustment reduces the circulator market where there is direct Metrorail service. Where direct Metrorail service is available to most travelers between the areas, 50% of trips were excluded from the likely circulator market. Where direct Metrorail service is available to only some travelers between the areas, 25% of trips were excluded from the likely circulator market. The resulting estimated daily market for circulation trips on the circulator is shown in Table 3-10. The table shows a potential market of over 35,000 circulation trips in the core area.

3.1.7 Summary of Potential Circulator Markets

The potential markets for the circulator can be thought in terms of both access trips and circulation trips related to both area attractions and core area employment and commercial activity. The total estimated potential daily market in each category is as follows in Table 3-11.

Table 3-10: Estimated Daily Circulator Market for Trips Between Areas

		Destination																	
		Downtown	Union Sta.	NoMa	Capitol	Mall	White House	Mt. Vernon	L'Enfant	Waterfront	Southwest	Constitution West	GWU	Penn. Ave.	K Street	DuPont Circle	West End	Georgetown	TOTAL
Origin	Downtown	1,391	196	143	608	79	391	110	325	189	0	290	159	257	783	0	0	1,017	5,935
	Union Sta.	198	0	50	245	37	110	39	212	73	0	82	53	84	278	0	0	266	1,724
	NoMa	141	49	0	83	11	34	10	59	21	0	22	16	28	171	0	0	80	722
	Capitol	604	244	82	1,096	40	193	55	184	147	0	138	47	67	429	0	0	362	3,685
	Mall	79	36	12	42	18	25	6	37	19	0	22	12	18	102	0	0	66	492
	White House	390	106	36	193	25	315	28	161	59	0	82	60	105	517	0	0	336	2,412
	Mt. Vernon	109	40	11	55	11	27	0	52	17	0	22	15	23	134	0	0	71	585
	L'Enfant	332	210	60	184	37	168	52	0	91	0	134	44	65	382	0	0	378	2,135
	Waterfront	193	73	20	150	22	62	17	91	0	0	44	30	43	284	0	0	135	1,162
	Southwest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Constitution West	290	82	23	138	21	82	20	126	42	0	229	48	85	0	0	0	0	1,183
	GWU	155	53	15	46	11	61	17	42	29	0	49	0	0	0	0	0	0	478
	Penn. Ave.	257	85	27	66	16	99	22	62	43	0	88	0	213	291	0	0	278	1,546
	K Street	783	285	168	430	104	490	135	362	280	0	0	0	294	2,309	0	0	1,744	7,382
	DuPont Circle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	West End	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Georgetown	1,024	269	82	358	70	334	70	368	137	0	0	0	278	1,718	0	0	1,220	5,926
	TOTAL	1,157	330	172	837	73	367	251	368	528	0	248	140	875	1,806	0	0	5,951	35,368

Table 3-11: Summary of All Potential Circulator Markets

Access to/from Attractions ²³	148,318
Circulation among Attractions	45,336
Access to/from Employment/Shopping	0
Circulation of Employees and Shoppers	35,368

²³ This figure is twice the figure in Table 3-8 since it reflects one-way trips rather than round trips.

The likely share of each market that could be captured by the circulator will vary substantially by market and within each market. The circulator is unlikely to capture a large share of access trips to attractions from Metrorail lines, but the market is large. A larger share of access trips from hotels could be captured, but these represent a small share of access trips. Circulation trips are more likely to make use of the circulator, particularly those between attractions and those within the primary circulator service area.

3.2 Review of Circulators in Other Cities

In order to gain insights into the potential market and develop an operations plan for a downtown circulator in Washington, DC, Multisystems contacted nine operators of U.S. downtown circulator systems. Discussions were held by telephone with some contact by e-mail.

Representatives of the following services were contacted:

- Austin, TX ('Dillo routes)
- Chattanooga, TN (Downtown Electric Shuttle)
- Dallas, TX (M-Line Trolley Bus)
- Denver, CO (Cultural Connections Trolley and 16th Street Mall Shuttle)
- Los Angeles, CA (Downtown DASH routes)
- Miami Beach, FL (Electrowave)
- Milwaukee, WI (Milwaukee County Transit Trolley)
- Oklahoma City, OK (Oklahoma Spirit Trolley)
- Orlando, FL (Lynx Lymmo)

A basic description of each of these downtown circulators is given in Table 3-12. Table 3-13 summarizes various characteristics of the circulator services. The remainder of this section summarizes the findings of the review using the following categories.

- Routes and Physical Elements
- Service Elements
- Fare Structure
- Vehicles
- Public Information
- Capital and Operating Costs

3.2.1 Routes and Physical Elements

The number of circulator routes varied among the cities. Four of the nine cities have only one downtown circulator route. Miami Beach has two. Milwaukee has three. Austin has five, while Los Angeles and Oklahoma City each have six. The circulator routes tend to be relatively short in distance. All of the routes are less than 8.5 miles round trip and most are around 3 miles round trip. The routes serve a number of different attractions in the downtown area, including government office buildings, hotels, cultural attractions, restaurants, and major shopping areas. In cities with multiple circulator routes, different routes may have different purposes. For example, one or two of the routes may be geared towards tourists and the other routes may focus on downtown office workers.

In all cases, the circulator service has its own signage and, in four cases, unique shelters that distinguish it from the other transit services in the downtown area. In Oklahoma City, major stops have unique shelters that have been designed to fit in with the surrounding environment

Table 3-12: Examples of Cities with Downtown Circulators

City	Name of Service	Operating or Funding Agency	Characteristics
Austin, TX	"Dillo" routes	Capital Metropolitan Transportation Authority	Historic reproductions of trolley cars provide circulator service to downtown Austin, the Capitol Complex, University of Texas campus, and free Park and Ride lots. The service consists of 5 routes and is offered free of charge. The Dillo routes serve a number of destinations, including shops, restaurants, the convention center, major employers, and tourist attractions.
Chattanooga, TN	Downtown Electric Shuttle	CARTA	The Downtown Electric Shuttle in Chattanooga has played a key role in the downtown area's redevelopment. It operates 7 days a week with a 5 minute headway and is free to riders. The service is provided with low-floor, electric vehicles and the operating costs are partially subsidized with parking revenues.
Dallas, TX	M-Line Trolley Bus	DART	DART operates a downtown circulator, the M-Line shuttle trolley bus, that serves the heart of the downtown area. The service operates 7 days a week and the fare is the same as other DART buses (\$1.00). In addition to major attractions in the downtown area, the shuttle also provides connecting service to the McKinney Ave. trolley station.
Denver, CO	Cultural Connections Trolley and 16th Street Mall Shuttle	RTD	RTD initially operated the Cultural Connections Trolley, which was primarily geared towards tourist attractions. Because the service did not produce adequate ridership, it is now being contracted to a private company. However, Denver does operate a circulator on the 16th Street Mall, which is provided free of charge and operates in its own right-of-way. It is RTD's best-performing route.
Los Angeles, CA	DASH	Los Angeles DOT	Los Angeles's DASH service operates seven circulator routes in the downtown area. Fares are \$0.25 and service is provided every 5 to 10 minutes on weekdays. On weekends, three of the routes operate, with a 15 to 20 minute headway. The circulators serve a number of destinations, including cultural attractions, city hall, the courthouse, restaurants, and employer sites.
Miami Beach, FL	Electrowave	Miami Beach Transportation Management Association	The ELECTROWAVE shuttles serve the heart of South Beach on Washington Avenue and Collins Avenue. The service enables tourists, residents, visitors, and local employees/employers to get around South Beach for only \$0.25. The service is provided with electric vehicles that are wrapped in art work by various local artists.
Milwaukee, WI	Milwaukee County Transit Trolley	Milwaukee County Transit System	The MCTS Trolley serves the major events and attractions in downtown Milwaukee. The service consists of four routes (Lake Route, River Route, Valley Route, and Walker's Point extension). Trolleys run on 10 to 12 minute headways and the fare is \$0.50 per one-way trip. Hours of operation vary among the routes.
Oklahoma City, OK	Oklahoma Spirit Trolley Service	COPTA	The Oklahoma Spirit trolley service, connects the Downtown/Bricktown area and the I-40/Meridian hotel and restaurant district. The trolleys provide shuttle service seven days a week. There are 6 lines (red, blue, green, brown, orange, and yellow) that serve a number of major destinations, such as hotels, major employers, universities, tourist locations, and restaurants. The fare varies on the different lines.
Orlando, FL	LYMMO	LYNX	Lynx's LYMMO service provides transportation for employees and visitors in downtown Orlando. The service is provided with low-floor buses decorated with whimsical designs. During office hours, LYMMO operates every 5 minutes. After hours and on weekends, the service operates on a 10 to 15 minute headway. LYMMO has its own lane and controls its own traffic signals in order to ensure that it is never slowed down by traffic. The service is free to riders.

Downtown Circulator Implementation Plan

Table 3-13: Downtown Circulator Characteristics

City	Service	Number of Routes	Roundtrip Length (miles)	Connecting modes / services	Span of Service	Peak Headway	Off-Peak Headway	Dedicated Right-of-Way?	Fare Structure	Annual Ridership
Austin	Dillo Service	5	3.5-8.5	Local buses	M-F 6:30am-8:30pm; Sat. 7am-6:30pm; Sun. 9am-6:30pm; Varies by route	8-10 minutes commuter; 20-30 minutes tourist	8-10 minutes commuter; 20-30 minutes tourist	No	Free	1,118,523
Chattanooga	Downtown Electric Shuttle	1	3	Local and express buses; parking	M-F 6am-9:30pm; Sat. 9am-9:30pm; Sun. 9am-8:30pm	5 minutes	5 minutes	No	Free	900,000
Dallas	M-Line Trolley Bus	1	2	Streetcar; light rail	M-F 7:30am-10pm; Sat. 10:30am-10:30pm; Sun. 12:30pm-10pm	15 minutes	30 minutes	No	\$0.50; No free transfers; Integrated with other services	125,000
Denver	16th Street Mall Shuttle	1	2.8	Local and express buses; light rail, Amtrak	M-F 5am-1:35am; Sat. 5:30am-1:35am; Sun. 7am-1:35am	4-8 minutes	15-30 minutes	Yes	Free	16,700,000
Los Angeles	Downtown DASH routes	6	3-7	Local and express buses; heavy rail; Amtrak, commuter rail	M-F 6am-7pm; Sat. 6:30am-5pm; Sun. 10am-5pm; Varies by route	5-12 minutes	5-12 min.; 20 min. Downtown (weekends)	No	\$0.25; One free transfer; MTA passes accepted; Single-ride tickets and monthly passes	
Miami Beach	Electrowave	2	1.5-3	Local and express buses	M-Sat 8am-1am; Sun. 10am-1am	10-12 minutes	10-12 minutes	No	\$0.25; Seniors and disabled free; May pay with parking meter debit card; Museum and hotel patron passes	500,000
Milwaukee	Milwaukee County Transit Trolley	3	5	Local and express buses	M-Th 6:30am-10pm; F 6:30am-midnight; Sat. 10am-midnight; Sun. 10am-6pm;	10-20 minutes	10-20 minutes	No	\$0.50; \$0.25 for seniors and disabled; Free transfers from local and express routes	700,000
Oklahoma City	Oklahoma Spirit Trolley	6		Parking	M-Sat 7am-11pm; Sun. 7am-6:30pm; Varies by route	10-20 minutes; 60 minutes on tourist route	10-25 minutes; 60 minutes tourist route	No	\$0.25-\$0.50; \$0.10-\$0.25 for seniors and disabled; 3-day pass available for \$2	
Orlando	Lymmo	1	2.7	Parking	M-Th 6am-10pm; F 6am-midnight; Sat. 10am-midnight; Sun. 10am-10pm	5 minutes	10-15 minutes	Yes	Free	

Table 3-13: Downtown Circulator Characteristics (cont.)

City	Service	Type of Vehicle	Type of Fuel	Vehicle Seating Configuration	Facilities at stops	Cost per Vehicle	Capital Funding Sources	Operating Cost / Revenue Vehicle Hour	Operating Funding Sources
Austin	Dillo Service	Trolley	Diesel	Perimeter and forward-facing	Distinctive signs that are a different color and have an armadillo icon.	\$269,000	Local funding	\$62 (weekday) / \$45 (weekend)	Sales tax, investment income, other local revenue sources
Chattanooga	Downtown Electric Shuttle	Low-floor bus	Electric	Perimeter	Simple shelters	\$200,000	FTA; State DOT; Local MPO		Parking revenues
Dallas	M-Line Trolley Bus	Trolley	CNG	Perimeter and forward-facing	Posts with trolley decal and "Guide-a-Ride"	\$300,000	80% FTA; 20% local	\$54	10% fares; Sales tax revenue (DART portion); Downtown Improvement District
Denver	16th Street Mall Shuttle	Low-floor bus	Electric/CNG hybrid	Perimeter	Stations at end of route	\$450,000	FTA; local funding	\$51	RTD general funding (sales tax funds)
Los Angeles	Downtown DASH routes	Low-floor bus	Propane	Perimeter	Posts with DASH symbol; Eye-level information	\$260,000	LADOT	\$47	12-13% fares; Remainder sales tax revenue
Miami Beach	Electrowave	Low-floor bus	Electric	Perimeter	Posts with Electrowave sign	\$212,000	FTA; State DOT; Toll revenues	\$32	60% city; 20% State DOT; 15% concurrency funds; Reminder fares, grants, and advertising revenue
Milwaukee	Milwaukee County Transit Trolley	Trolley	Diesel	Perimeter and forward-facing	Eye-level signs showing routes and schedules	\$250,000	80% FTA; 20% local	\$72	80% CMAQ grant; 10% fares; Local casino and BID contribute funds
Oklahoma City	Oklahoma Spirit Trolley	Trolley	Diesel	Perimeter and forward-facing	Some stops have specially designed shelters	\$270,000	Sales tax	\$38	4% fares; 18% federal funding; Remainder local; Area attractions contribute some funding
Orlando	Lymmo	Low-floor bus	CNG	Perimeter seating and lean bars	Stations have unique shelters		FTA; State DOT, Local match		Downtown property tax; Parking revenues

(for example, in Bricktown, the shelter has a brick façade). Chattanooga and Orlando also designed unique shelters that would distinguish their circulators from other transit services. Denver's 16th Street Mall Shuttle connects two state-of-the-art inter-modal transit stations that include dynamic signage directing riders to their bus bays.

Most of the circulator services do not have exclusive bus lanes or traffic signal priority. The exceptions to this are Lynx's Lymmo service, which operates in its own right-of-way and has signal priority, and Denver's 16th Street Mall Shuttle, which operates in a pedestrian mall. Vehicles on Los Angeles's downtown DASH service are also equipped with transponders that give them some level of control over traffic signals.

3.2.2 Service Elements

During the week, services generally start early in the morning (between 5am and 7am) and run until at least 7pm. Seven of the nine cities operate their circulators until after 9pm on weekdays, and two of the cities (*Denver, Miami Beach*) operate after midnight.

All of the cities provide at least some service on weekends, although this service may be only a subset of the routes operated during the week. Weekend services start later in the morning than weekday service and may run until later in the evening. Four of the cities (*Denver, Orlando, Miami Beach, Milwaukee*) operate weekend services until or past midnight. Los Angeles operates only two of its regular DASH routes on weekends and adds a separate Downtown Discovery tourist route.

Two of the cities change their service levels seasonally. Milwaukee cuts back on service during non-summer months since demand is lower during this time. During the summer, the circulator has two extensions to popular attractions. During the remainder of the year, these extensions are not operated and the service frequency is lower. Oklahoma City's tourist route operates only from June through September.

The circulators typically experience three peaks in ridership: morning, lunchtime, and evening. Five of the cities (*Chattanooga, Miami Beach, Milwaukee, Los Angeles, Austin*) do not vary the headways on their circulators throughout the day. The remaining cities have more frequent service during the AM peak, lunchtime, and the PM peak. Three of the cities (*Austin, Los Angeles, Oklahoma City*) have longer headways on their tourist-oriented routes than their routes that serve downtown workers.

During peak hours, five of the cities (*Chattanooga, Denver, Orlando, Austin, Los Angeles*) provide service with headways less than 10 minutes. Three cities (*Miami Beach, Milwaukee, Oklahoma City*) offer peak headways of 10-20 minutes. Dallas has a 15-minute peak headway.

During off-peak hours, three of the cities (*Chattanooga, Austin, Los Angeles*) provide service with headways less than 10 minutes. Four of the remaining cities (*Orlando, Miami Beach, Milwaukee, Oklahoma City*) have off-peak headways ranging from 10 to 20 minutes. Denver and Dallas have off-peak headways as high as 30 minutes on their circulators.

Most of the agencies reported that their ridership is a mix of downtown workers, conventioners, residents, and visitors. Agencies believe that different service characteristics are important to different market segments. According to the interviewees, the most important service characteristics for attracting downtown workers are shown in Table 3-14.

Table 3-14: Important Service Characteristics for Each Market

Downtown Workers	Tourists and Visitors
Most Important <ul style="list-style-type: none"> ▪ Frequency ▪ Directness of service ▪ Travel time ▪ Reliability ▪ Simple schedule 	Most Important <ul style="list-style-type: none"> ▪ Information/signage ▪ Uniqueness of the vehicles ▪ Serve tourist attractions
Also Important <ul style="list-style-type: none"> ▪ Cleanliness ▪ Low Fare ▪ Perimeter seating 	Also Important <ul style="list-style-type: none"> ▪ Friendliness of drivers ▪ Knowledgeable drivers ▪ Availability of a day pass

3.2.3 Fare Structure

The fare on these services is generally lower than that on other services in the city. Four of the cities (*Austin, Chattanooga, Denver, Orlando*) do not charge a fare on their circulator services. Fares in the remaining cities are as follows:

- Dallas: \$0.50 (regular fares are \$1.00)
- Los Angeles: \$0.25 (same on all DASH routes)
- Miami Beach: \$0.25
- Milwaukee: \$0.50; \$0.25 for seniors/disabled (regular cash fare is \$1.50)
- Oklahoma City: \$0.25 for downtown; \$0.50 if travels outside of downtown zone. (regular cash fare is \$1.10)

Passes for the circulator services are only an issue for the five systems that charge a fare. In Oklahoma City, riders can purchase a 3-day magnetic stripe pass for \$2, which gives them unlimited use of the trolley service. These passes cannot be used on the regular fixed-route system. Other interviewees acknowledged that having such a pass would make the service more attractive to visitors. In Los Angeles, riders can purchase a monthly pass from LA DOT that can be used on all DASH services. Miami Beach is currently working on a program to provide free unlimited-ride passes to hotel patrons and partners with the Convention & Visitors Bureau to provide a \$10 museum pass. This pass allows holders to access five area museums and ride the Electrowave for free.

Of the five cities that do not provide free service, three (*Dallas, Milwaukee, Los Angeles*) have integrated their fare structure with that of other transit services. These systems allow riders to board for free with passes from other services/systems. In Milwaukee, riders who have a pass from the fixed route system can board the trolley for free. MTA riders in Los Angeles can use their monthly passes on the DASH service. However, DASH does not accept passes from any of the other operators in Los Angeles. Los Angeles is in the process of implementing a regional smart card system, and once this is completed the smart cards will be accepted on the DASH routes. The M-Line trolley bus in Dallas is part of the DART system, so regular passes can be used on the downtown circulator. While Oklahoma City has not integrated the fare structure on

the trolley service with other local transit services, patrons of their parking facilities can ride the trolleys for free by showing their parking ticket.

3.2.4 Vehicles

All interviewees pointed to the importance of having unique-looking vehicles. While four of the agencies (*Austin, Dallas, Milwaukee, Oklahoma City*) have opted for the “retro” look provided by trolleys (which are primarily diesel-fueled), the remainder have gone with CNG, electric, or hybrid low-floor buses that have a more innovative look. In general, having comfortable seating on the vehicles was seen as an important factor in attracting riders. Three of the circulator services (*Chattanooga, Miami Beach, Los Angeles*) have vehicles with perimeter seating only, while the others have a combination of perimeter and forward-facing seats. The agencies with perimeter seating thought it was desirable because it provides space for more standees and allows people to easily communicate with each other.

It is important to purchase vehicles with large, clear windows. In this way, people on the street can see that other people are actually using the service and the people in the bus can clearly see the attractions along the route. Also, a unique vehicle type can be important in attracting riders.

3.2.5 Public Information

All interviewees pointed to the importance of providing the public with adequate information about the service – particularly at stops along the routes. Oklahoma City has produced pocket-size guides to its trolley service that are easy for downtown workers and visitors to carry around with them. Five of the nine cities (*Chattanooga, Dallas, Miami Beach, Milwaukee, Los Angeles*) mentioned having eye-level information at circulator stations and stops.

Only two of the circulator services (*Orlando and Oklahoma City*) provide real-time wayside information for riders; however, many of the interviewees thought this would be a desirable addition to service.

3.2.6 Capital and Operating Costs

Vehicle costs range from \$200,000 to \$300,000 each. Only two of the nine cities did not receive funding from the FTA for the purchase of their circulator vehicles. Los Angeles and Oklahoma City paid for their vehicles entirely with local funding. Costs for shelters depend on the size and level of customization and range from \$18,000 (Chattanooga) to \$55,000 (Oklahoma City) each. Agencies that don’t have shelters along their trolley routes typically use an information post with eye-level information, at a unit cost of around \$100.

Operating costs range from \$32/revenue vehicle hour to \$72/revenue vehicle hour. Interviewees indicated that operating costs are not significantly different from traditional transit services.

There are many different sources for operating funds:

- Fares (for services that are not free) generally cover between 5% and 15%.
- CMAQ grant (Milwaukee)
- Downtown BID
- Parking fees
- Downtown property owners tax
- Sales tax
- Local funding (city)
- Concurrency funds (impact fees on local development)

- Museums and other cultural attractions
- Advertising revenues
- Convention and Visitors Bureaus
- Other private entities, such as shopping malls and casinos

3.2.7 Service Design Strategies to Target Circulator Markets

The findings from the review of other circulators lead to several conclusions that are informative in the design and implementation of a circulator for Washington, DC.

Routes and Physical Elements

While several cities operate just a single circulator route, just over half of those interviewed operate multiple routes. Los Angeles, in fact, has six downtown circulator routes. Washington's plan for four routes seems consistent with what other cities have done. Most circulator routes identified are around three miles in length for a round trip. None were found over 8.5 miles. Direct, fast, and reliable service was noted by operators as an important factor in attracting the downtown worker market. The proposed Washington routes, at 4.2 to 9.2 miles round trip are at the high end of the range, with the K Street route, at 9.2 miles round trip, longer than any other circulator examined. With routes this length, it becomes more difficult to maintain consistent intervals between buses, which can jeopardize the reliability that was noted as a key service characteristic for this type of service. The construction of the busway along K Street should allow reliable service to be provided in the corridor.

Most of the services identified serve a variety of functions, carrying downtown workers, shopping and entertainment trips, and visitors. Those with multiple routes often have one or two-tourist-oriented routes with other routes following the travel patterns of downtown workers. The routes in Washington's proposed system would also have a mix of trip purposes that varies from route to route. In several cities, the circulator functions as a distributor service for downtown parking facilities, and to some extent for commuter transit services. The proposed Washington circulator differs from these in that it is more oriented to circulation within the Monumental Core and downtown, and to providing and access to visitor attractions, than it is to serving commuter trips. In Washington, most commuter trips can be served adequately by Metrorail and Metrobus.

Service Elements

Most of the circulators typically operate from around 6 or 7 a.m. to at least 9 p.m. This reflects the commuter orientation of most circulators in the morning and the dinner and downtown evening entertainment market at the end of the service day. Several services operate past midnight on weekends. All provide at least some weekend service. The lower expectation for commuter ridership in Washington needs to be considered in selecting an appropriate morning start time and service levels. Evening service should be considered, but the early closing of Mall attractions, late closing of the monuments, and varied closing hours for downtown entertainment venues will have to be taken into account.

Frequent service was noted as an important service characteristic, especially for the downtown worker market. Several circulators offer peak service every 5 minutes and the majority operate at least every ten minutes. In off-peak periods, only three have at least one route operating more frequently than every 10 minutes, while the majority run at least every 20 minutes. In several cases, tourist oriented routes are operated less frequently than downtown worker-oriented routes.

Washington's proposed service level of every five minutes at most times is better than most circulator services examined.

Most circulators experience three peak periods, morning rush, lunch, and afternoon rush. Thus it is important to provide adequate mid-day service. Washington circulator service should be carefully designed to accommodate expected peak travel flows for the markets being served.

Fare

Four of the nine circulator services studied are provided free of charge. The remainder charge much less than a regular transit trip (the highest is \$0.50). Three of the five charging a fare accept regular transit passes. Thus, in most cases, the circulator offers a nearly seamless transfer for regular transit users. For tourists, only one of the five systems charging a fare offers a short-duration pass, although one is developing a program to provide passes to hotel patrons and to include free use of the circulator to holders of a new museum pass. Washington would be different from all other cities if it charges more than a nominal fare or does not accept Metro passes. Washington could consider an arrangement to provide passes to hotel patrons, however, arrangements that tie passes to admissions to attractions offer less promise since most major attractions in Washington are free of charge.

Vehicles

All interviewees pointed to the importance of having unique-looking vehicles, especially in attracting the visitor market. Some have opted for the unique look of diesel-powered trolleys while the remainder have gone with CNG, electric, or hybrid low-floor buses that have a more innovative look. None use diesel conventional buses. Washington should identify a unique look for its vehicles that is appropriate for the type of service and the historical, monumental Washington DC environment. Alternative fuel vehicles can be used and have been proven successful for other downtown circulators.

Service Identity / Public Information

All interviewees pointed to the importance of providing the public with adequate information about the service – particularly at stops along the routes. In all cases, the circulator service has its own signage, but only four of the nine cities have unique shelters that distinguish it from the other transit services in the downtown area. The Washington circulator should be implemented with adequate information on the street, as well as in Metrorail stations, parking facilities, hotels, visitor attractions, and in tourist guides.